



U.S. Army  
Corps of Engineers

## IWR White Paper



### Emerging Container-on-Barge Transport in the U.S. May 2004

#### Executive Summary

- Container-on-barge (COB) transport could add not only new cargo, but also a new raison d'être for some reaches of the inland and intracoastal waterways in the United States.
- While the many bulk cargoes moved by water are experiencing modest or flat growth, the numbers of containers needing to be moved within U.S. is steadily and rapidly increasing.
- Highway traffic forecasts indicate looming increases in freight movements that threaten to choke the U.S. interstate system with truck congestion. COB could use existing jumbo barges capable of holding 72 TEU (twenty foot equivalent units) containers (stacked 3-high), thus taking at least 36 trucks off the road for each fully loaded barge.
- Containers-on-barge are commonplace in Europe, where waterways are being used as relief valves for highway congestion. COB traffic on the Rhine River has skyrocketed from less than 10,000 units in 1975 to 45,000 units in 1991 and 2,300,000 units in 2003.
- Here in the U.S., COB is already established on the Columbia-Snake River system and has grown from 125 containers in 1975 to 50,000 in 2000.
- Thus far coastal COB ventures appear most promising, particularly with the extent to which COB can relieve both highway congestion and reduce air emissions. The ports of Houston and New York have each received Congestion Mitigation & Air Quality funds under the TEA-21 to support container-on-barge operations.
- Other recent developments include:
  - Osprey Line has established COB service along the GIWW connecting Gulf Coast ports from Houston and Freeport, TX to Pensacola, FL, and last month also began service from Memphis to Louisville, advancing COB up the Mississippi and Ohio Rivers (a stretch which contains locks).
  - Kirby Corporation, a mainstream barge company, has purchased a one-third interest in Osprey Line, thus expressing confidence in COB's future.
  - COB service began in 2003 on the Hudson River between Port NY/NJ & Albany.
  - Port of NY/NJ is funding an east coast network of COB ports, including Wilmington, DE, Camden, NJ, Bridgeport, CT, and Providence, RI, with a pilot feeder barge service between the ports of Bridgeport and NY/NJ.
  - Port of Pittsburgh and Pittsburgh Barge Shippers Council are pursuing means to reduce impediments to COB, with Mexico identified as a potential market.
- Obstacles to greater use of COB in U.S. still remain, including: price competition from alternative competing modes; the potential unreliability that locks & dams introduce into the logistics chain; and double handling fees at ports.
- Corps should consider hosting a workshop aimed at exploring methods for overcoming impediments to COB service, and facilitating discussions with industry stakeholders, members of the Inland Waterways Users Board and Congressional interests, including

consideration of initiatives such as Corps-interagency sponsored COB demonstration projects.

### Discussion of Potential

Container-on-barge (COB) transport could add not only new cargo, but also a new *raison d'être* for some reaches of the inland and intracoastal waterways in the United States. The numbers of containers needing to be moved into, out of, and within the U.S. is steadily and rapidly increasing, and COB could fill a niche market in the transport of containers that are not time-sensitive, containers that exceed highway weight limits, and the repositioning/prepositioning of empty containers.

Containers on barges are becoming commonplace in Europe, where the waterways are being used as relief valves for severe highway congestion. COB traffic on the Rhine River has skyrocketed from less than 10,000 units in 1975 to 45,000 units in 1991 and to 2,300,000 units in 2003.

Here in the U.S., COB is already established on the Columbia-Snake River system and has grown from 125 containers in 1975 to 50,000 in 2000.

### Obstacles

Nascent COB operations face the proverbial “chicken and egg” problem. Carriers say that if there is a demand, they will provide the service. Shippers say that if there were a service, they would use it. Incentives and monetary support may be needed to get past this, a possible role for government agencies.

Price competition from alternative, competing modes has in the past been a major problem. Several embryonic COB ventures on the Mississippi River were reportedly driven out of business in the 70s and 80s by temporary price undercutting on the part of competing modes.

Locks and dams are perceived to be a barrier because of the unreliability that they introduce into the logistics chain. A Pittsburgh study cited this as a significant problem because freight moving in and out of Pittsburgh has to go through more locks than any other inland port (Port of Pittsburgh Commission, 2003). The Osprey line, which has recently started COB service in the GIWW and lower Mississippi, believes that locks would hinder their efforts to maintain a regular schedule.

On the positive side, express tow services, operating with few barges, would fit in the small, older lock chambers, and there would be no need to stop and split the tow. This would shorten the trip from Pittsburgh to the lower Gulf by as much as a week (Port of Pittsburgh Commission, 2003). Also, computerized river traffic information systems may be able to play a role in expediting the movement of COB traffic through the inland waterway system.

An important next step towards overcoming both the “chicken and egg” obstacle and the locks and dams problem would be a demonstration project to move containers by barge on a part of the inland system that contains locks and dams.

Double handling fees appear to be one of the most important financial barriers. All traffic is double handled at an ocean port, but the fees for the second handling by barge are similar to the cost of handling the ocean vessel instead of the much lower fee for handling trucks or rail cars. Exceptions to this have been made on the Rhine River system and the Columbia-Snake River system, where COB pricing is integrated with ocean costs as a total package and is then competitive with truck and rail.

Alternatively, the whole ‘double handling fee’ problem, as well as port congestion, can be avoided by doing a midstream, direct transfer of containers from ship to barge. A company called SeaPointe has proposed construction of such a facility below New Orleans. Transfer of incoming containers directly from an international carrier to a short-haul barge service, rather than to port container yards, also reduces storage costs and ‘dwell time’ (the time containers spend in port before they can be picked up by trucks for final delivery, which averages 8 days in major ports). Transferring containers directly to barges makes the dwell time zero, and even though the barges are slower, cargo can often be delivered earlier. Another idea proposed by a company called SeaWorthy would be to lash entire tank barges onto a modified single hull liquid carrier mother ship.

Barges also have an image problem, which hinders marketing efforts. Barge transport is low profile to the point of invisibility in most of the U.S. Barges are relatively quiet and unobtrusive, basically unnoticed. Where awareness of barges does exist, the popular image is the ‘slow barge’, filled with coal or grain.

#### Infrastructure and Equipment Requirements

COB could use existing jumbo barges, which are capable of holding 72 TEU containers (stacked 3-high). This translates to at least 36 truck units per barge.

Major inland river terminal construction is not necessary to initiate COB service. Basic requirements are: ground storage (with sufficient ground strength); cranes (or in some cases stackers); container forklift; good highway connections and a weigh station for trucks (in most states weight limit of a truck pulling a container is 80,000 pounds, which means a 20 – 25 ton container maximum). Some containers are too heavy and need to be repacked prior to movement on highways.

The capability of barges and waterways to handle overweight containers is both an advantage and a possible constraint in terms of moving a container to or from a river loading site. On the Columbia River the overweight containers are stuffed close to the river port and take advantage of weight exemptions within a certain distance of the port. Such overweight containers may effectively take more than one truck off the highway per container.

The Pittsburgh COB feasibility study reported that some river terminals may need to upgrade key equipment such as spreader bars and container forklifts, and technical knowledge of handling containers, but no extensive investments are required to start COB service. The estimated cost of these upgrades is between \$300,000 and \$1,000,000 (Port of Pittsburgh Commission 2003).

There are two basic ways to handle containers on barges: lift them on and lift them off (LO/LO); and roll them on and roll them off (RO/RO).

Terminal facilities and equipment needed for both types are specified in the table below (Connecticut DOT, 2001).

RO/RO	LO/LO
No crane needed, no stackers needed	Requires mobile harbor crane or reach stackers
Yard tractors	Yard tractors
Generally, less labor for operation	More labor for operation
Need ramps at terminals or barges with self-contained ramps	No ramps needed

#### Characteristics of Successful COB Services

COB services that work are successful logistical operations that combine transportation modes, thus promoting COB in an integrated, systemic way.

Other attributes of successful systems:

- Efficient, cost-effective terminal operations
- Efficient and reliable barge sailing and delivery schedules
- Effective container/chassis equipment control and repair systems
- Security, insurance, and risk control systems
- Sophisticated communications systems and extensive preparatory marketing

Note that although COB generally involves higher value cargo, greater transport speed is not necessarily a requirement. **Reliability is, however, absolutely essential.**

#### Congestion and Air Quality Benefits

To the extent that barges can take trucks off heavily traveled highways, they both relieve congestion and reduce air emissions. Another research effort at IWR has investigated these benefits of water transport (draft paper, the Nontraditional Benefits of Inland Navigation).

In recognition of these benefits, the ports of Houston and New York have received CMAQ (Congestion Mitigation and Air Quality) funds under the TEA-21 (Transportation Efficiency Act of the 21<sup>st</sup> Century) to support container-on-barge operations.

Renewal legislation is now in Congress in the form of the SAFTEA (Safe, Accessible and Flexible Transportation Act) bill. It is expected that use of money appropriated under this new act will also be justified for container-on-barge operations as long as they alleviate congestion and air quality problems.

#### Recent Developments.

Osprey Line has established COB service along the GIWW connecting Gulf Coast ports from Houston and Freeport, Texas to Pensacola, Florida. Earlier this year it began weekly COB service between the Louisiana ports of New Orleans and Baton Rouge. This appears to be an emerging niche market with most of the boxes exceeding the highway truck weight limits. Containers of rice on trucks can only be filled to 80% capacity because of weight restrictions. Barge transport eliminates this problem, allowing fewer numbers of heavier, 100% full containers. And just last month Osprey began container-on-barge service from Memphis to Louisville, Kentucky, thus advancing its service up the Mississippi and Ohio River systems (Waterways Journal March 2004).

In another innovative move, Osprey is streamlining the transport process with electronic dock receipts. This enables the receiving port to have the paperwork before the barge arrives. Osprey also has software which allows the shipper to track their cargo.

As further evidence of confidence in COB, Kirby Corporation, a mainstream barge company which operates tank barges throughout the U.S. inland waterway system, has purchased a one-third interest in Osprey Line. Joe Pyne, President of Kirby and a U.S. Section PIANC Commissioner, stated in the press release, "In the next 5-10 years, we believe this business (the container-on-barge feeder service) will develop into a key component of the U.S. transportation system, as it has already done in Europe." (Kirby Corporation Press Release April 16, 2004, Houston, Texas).

In the northeast, the Port Inland Distribution Network is a new system for distributing international containers arriving in the Port of New York and New Jersey to inland locations by barge and rail. Barge service began on the Hudson River between the Port of New York and New Jersey and Albany, New York in April 2003.

Short-sea shipping on barge is also expanding along the Atlantic seaboard. The sound bite is 'W-95', a waterway alternative to the perpetually congested I-95. In this initiative, the Port of New York and New Jersey is funding an east coast network of COB ports, including Wilmington, Delaware, Camden, New Jersey, Bridgeport, Connecticut, and Providence, Rhode Island. Ports willing to embrace the COB service are eligible for at least \$1 million each in marketing and startup funds, which includes a \$25 payment for each loaded container processed at the port (Daley 2004).

In January 2004, state funding (\$1.5 million) was approved for a pilot feeder barge service between the ports of Bridgeport, Connecticut and New York/New Jersey (Daley 2004). Congestion on the stretch of I-95 in southern Connecticut was a driving force

behind this program. The money will be used to fund the design and construction of a barge off-ramp at the Bridgeport terminal to enable unloading of containers.

The state of Massachusetts and the city of Portland, Maine have also launched major efforts to lure barges to Fall River, New Bedford, and Gloucester.

### Organizational Movements

Organizations are being formed to promote and facilitate COB transport. MARAD is sponsoring the Inland Waterway Intermodal Cooperative Program (IWICP), which brings together port directors, terminal operators, barge and logistics companies and other public and private sector entities with the goal of increasing utilization of inland waterways for intermodal freight transportation.

In the fall of 2003, MARAD created a partnership between government and industry called the “Short Sea Shipping Cooperative Program”, with the acronym SCOOP. This group envisions an armada of short sea vessels of the RO-RO type, which could transport the 53-foot domestic containers (regular semi-truck trailers) that are causing so much congestion on the interstate highway system. They quote the ratio of 53-foot boxes to ISO units (20 and 40-foot) of 9 to 1.

In Pittsburgh, Pennsylvania, a council of barge shippers has been formed, the Pittsburgh Barge Shippers Council (PBSC). They have regular meetings and are working on the identification and resolution of the barriers to COB. In one initiative, the Port of Pittsburgh has developed a website called “SmartBarge” which addresses many of the organizational problems in matching shippers and barge companies. The address is <http://www.SmartBarge.com>.

The Pittsburgh Barge Shippers Council has concluded that COB service lends itself to a single intermodal operator to seamlessly handle a prospective shipper’s freight from point of origin to point of destination.

This Pittsburgh group is also analyzing the potential market coming out of Mexico for COB service. Many businessmen are surprised to learn that containers can be transported by water all the way from Brownsville, Texas (a short hop from Monterrey, Mexico) to Pittsburgh, Pennsylvania, deep in the American heartland. The Port of Pittsburgh has engaged a consultant to investigate the Mexican market. A recent report concluded that, “COB operations could be used to develop import and export trade with Mexico; import and export trade through the Gulf Ports of New Orleans and Houston; the repositioning of empty containers; and, in some cases, the domestic movement of containers.” (Port of Pittsburgh 2003.)

The Center for Ports & Waterways of Houston, Texas (an arm of the Texas Transportation Institute at Texas A & M University) is conducting a survey of river terminals to determine existing and needed infrastructure to support viable COB

transportation on the inland waterway system. This will provide valuable information for expansion of COB on the inland system.

### Implications of Container-on-Barge to the Corps Navigation Program

Expanding the scope of the inland and intracoastal waterways to include container traffic would broaden the base of support for the navigation system. Anyone who buys consumer goods, drives on congested highways, or breathes air could be a direct beneficiary of container-on-barge. The Corps, as steward of our inland and intracoastal navigation system, would be less vulnerable to accusations that it caters to special interest groups.

Although container-on-barge operations are unlikely, at least in the near future, to widely affect capital investment needs in the inland waterway system as a whole, they could provide an added basis for a well-maintained, reliable system.

Generally, no deepening of navigation channels would be needed to implement container-on-barge. However, since system reliability is a prerequisite for stakeholder service commitments, the investment in system-wide maintenance would need to reverse declines in levels of service through more certain O & M funding.

Strategies to overcome the many impediments to COB will require synchronized planning among many groups and agencies; the Corps cannot do it alone. The Corps must work with ports, shippers and carriers, state departments of transportation and economic development, regional and metropolitan planning organizations, as well as MARAD and the Coast Guard.

### Future Corps Actions

Corps activities could include a workshop, perhaps as early as this summer, involving the parties mentioned above, aimed at exploring methods for overcoming some of the impediments to COB service. Such a workshop could facilitate discussions between industry stakeholders with members of the Inland Waterways Users Board and congressional interests, and include consideration of longer-term initiatives, such as Corps-interagency sponsored demonstration projects aimed at further evaluating and assessing COB feasibility and demand.

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